

Claim Amendments

Applicants hereby amend claims 1-3 and 6-8 as shown below. Applicants also present new claims 10-17. The status of all claims, and the text of all claims under consideration, are as follows:

1. (currently amended) A Hall-current ion source apparatus comprising:
  - a discharge region;
  - means for supplying a flow of ionizable gas to said region;
  - an electron-emitting cathode at or near one end of said region;
  - an anode within said region whereon said anode has an electron-collecting surface;
  - a magnetic-field within said region and located between said surface and said cathode;
  - discharge means to generate ions from said gas and accelerate said ions out of said region;
  - characterized by said electron-collecting surface being contoured with a plurality of recesses or protrusions so as to increase the area of said surface by approximately one-half as compared to the area of said surface without said recesses or protrusions.

2. (currently amended) A Hall-current ion source apparatus comprising:

a discharge region;

one or more apertures within said region;

means for supplying a flow of ionizable gas to said region through said one or more apertures;

an electron-emitting cathode at or near one end of said region;

an anode within said region whereon said anode has an electron-collecting surface;

a magnetic-field within said region and located between said anode and said cathode;

discharge means to generate ions from said gas and accelerate said ions out of said region;

characterized by said electron-collecting surface being contoured with a plurality of recesses or protrusions, wherein approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

3. (currently amended) A Hall-current ion source apparatus comprising:

a discharge region;

one or more apertures proximate to said region;

means for supplying a flow of ionizable gas to said region through said one or more apertures;

an electron-emitting cathode at or near one end of said region;

an anode within said region whereon said anode has an electron-collecting surface with said surface located between said apertures and said one end;

a magnetic-field within said region and located between said anode and said cathode;

discharge means to generate ions from said gas and accelerate said ions out of said region;

characterized by said electron-collecting surface being contoured with a plurality of recesses or protrusions, wherein approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

4. (canceled)

5. (canceled)

6. (currently amended) A method for making a Hall-current ion source including:

providing a discharge region;

providing a means for supplying a flow of ionizable gas to said region;

providing an electron-emitting cathode at or near one end of said region;

providing an anode within said region with said anode having an electron-collecting surface thereon;

providing a magnetic-field within said region and located between said anode and said cathode;

providing a discharge means to generate ions from said gas and accelerate said ions out of said region; and

providing contours in said electron-collecting surface wherein said contours comprise a plurality of recesses or protrusions which increase the area of said surface by approximately one-half or more as compared to the area of said surface without said recesses or protrusions.

7. (currently amended) A method for making a Hall-current ion source including:

providing a discharge region;

providing a means for supplying a flow of ionizable gas to said region;

providing an electron-emitting cathode at or near one end of said region;

providing an anode within said region with said anode having an electron-collecting surface thereon;

providing a magnetic-field within said region and located between said anode and said cathode;

providing a discharge means to generate ions from said gas and accelerate said ions out of said region; and  
contouring said electron-collecting surface by creating a plurality of recesses in or protrusions on said surface so that approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

8. (currently amended) A method for making a Hall-current ion source including:

providing a discharge region;  
providing one or more apertures proximate to said discharge region;

providing a means for supplying a flow of ionizable gas to said region through said one or more apertures;

providing an electron-emitting cathode at or near one end of said region;

providing an anode within said region with said anode having an electron-collecting surface thereon;

locating said surface between said apertures and said one end;

providing a magnetic-field within said region and located between said anode and said cathode;

providing a discharge means to generate ions from said gas and accelerate said ions out of said region; and

contouring said electron-collecting surface by creating  
a plurality of recesses or protrusions on said surface so  
that approximately one-third or more of the area of said  
electron-collecting surface cannot be reached by straight  
lines originating from a point exterior of said ion source.

9. (canceled).

10. (newly presented) A Hall-current ion source in  
accordance with claim 1, wherein said electron-collecting  
surface is contoured with a plurality of conical recesses.

11. (newly presented) A Hall-current ion source in  
accordance with claim 1, wherein said electron-collecting  
surface is contoured with a plurality of protrusions.

12. (newly presented) A Hall-current ion source in  
accordance with claim 1, wherein said electron-collecting  
surface comprises a plurality of saw tooth contours.

13. (newly presented) A Hall-current ion source in  
accordance with claim 1, wherein said electron-collecting  
surface comprises a mesh screen.

14. (newly presented) A Hall-current ion source in  
accordance with claim 1, wherein said electron-collecting  
surface is contoured with a continuous spiral recess.

15. (newly presented) A Hall-current ion source apparatus  
comprising:

a discharge region;

means for supplying a flow of ionizable gas to said region;

an electron-emitting cathode at or near one end of said region;

an anode having an electron-collecting surface facing said region;

a magnetic-field within said region and located between said surface and said cathode;

discharge means to generate ions from said gas and accelerate said ions out of said region;

characterized by said electron-collecting surface having a plurality of recesses so as to increase the area of said surface by approximately one-half or more as compared to the area of said surface without said recesses.

16. (newly presented) A method for making a Hall-current ion source comprising the steps of:

providing a discharge region;

providing a means for supplying a flow of ionizable gas to said region;

providing an electron-emitting cathode at or near one end of said region;

providing an anode having an electron-collecting surface facing said discharge region;

providing a magnetic-field within said region and located between said anode and said cathode;

providing a discharge means to generate ions from said gas and accelerate said ions out of said region; and

contouring said electron-collecting surface with a plurality of recesses so as to increase the area of said surface by approximately one-half or more as compared to the area of said surface without said recesses.

17. (newly presented) A Hall-current ion source comprising:

a discharge region;

one or more apertures within said region;

means for supplying a flow of ionizable gas to said region through said one or more apertures;

an electron-emitting cathode at or near one end of said region;

an anode within said region whereon said anode has an electron-collecting surface; wherein said anode comprises a plurality of conducting layers separated by a respective plurality of non-conducting layers; wherein said non-conducting layers extend beyond said conducting layers;

a magnetic-field within said region and located between said anode and said cathode; and

discharge means to generate ions from said gas and accelerate said ions out of said region.